WATER QUANTITY SURVEYS COST SHARING AGREEMENT

CANADA - NEWFOUNDLAND

ANNUAL REPORT 1990-91

TO: Mr. D. G. Jeans
Administrator for Newfoundland

Mr. S. L. Fenety
Administrator for Canada

In accordance with Article XII of the Memorandum of Agreement covering Water Quantity Surveys in the Province of Newfoundland, we submit herewith the annual report for fiscal year 1990-91.

Members of the Coordinating Committee

W. Ullah
Member for Newfoundland
St. John's, Newfoundland

R. D. McBride
Member for Canada
Dartmouth, Nova Scotia

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INTRODUCTION

The year ending March 31, 1991 was the sixteenth in which water quantity surveys in Newfoundland were conducted under a Memorandum of Agreement between the Federal and Provincial Governments.

The Agreement establishes the basis on which cooperative water quantity surveys are made. It is administered for Canada by the Regional Director of the Inland Waters Directorate and for Newfoundland by the Assistant Deputy Minister, Department of Environment and Lands. A Co-ordinating Committee comprising the Chief, Water Resources Branch, Inland Waters Directorate, and the Director, Water Resources Division, Department of Environment and Lands, reports to the Administrators. It is the responsibility of the Co-ordinating Committee to prepare annually Schedules A and D for approval by the Administrators.

The Memorandum of Agreement includes four schedules:

1. Schedule A is a list of water quantity stations operated under the terms of the Agreement and their responsibility classification as: federal, federal-provincial or provincial.

2. Schedule B is a list of items that are to be included for cost sharing under the Agreement.

3. Schedule C details procedures for computing annual payments.

4. Schedule D provides a summary of annual payments.

Schedules A and D for 1990-91 are attached to this report in appendicies II and VII.

SUMMARY OF ACTIVITIES

The Canada-Newfoundland Co-ordinating Committee met once during the year - on March 25, 1991 at St. John's. The main topics covered during the meeting were as follows:

- The Annual Report for 1989-90 was reviewed and it was noted that the net balance between schedule "D" payments and actual costs over the years of the Agreement was $21,543 (Provincial under payment).

- It was agreed to move four stations from Provincial classification to Federal-Provincial in order to balance costs. With these changes in classification the schedule "A" listing of stations to be operated for 1991-92, was accepted.

- It was suggested that enough sediment data had been collected at the station Northeast Brook near Roddickton and a summary report should be prepared.

- The estimated cost of operations for 1991-92 was presented and agreed to by the Committee.

- The results were presented on the recent verification surveys conducted at locations where contributed data are collected.

- A proposal for a Newfoundland hydrometric network evaluation was discussed but very little work could be initiated during 1991-92.

- The Province was briefed on the Water Resources Branch's planned moderization of field instrumentation and procedures.

- The Province provided an update on the installation of instrumentation in the Humber River Basin in preparation for the planned forecasting system.

A copy of the notes from the Co-ordinating Committee meeting is included in Appendix VIII.

During 1990-91, 98 hydrometric stations were operated, designated as follows: Federal 23, Federal-Provincial 43, and Provincial 32. The Province paid $260,691 toward the $548,879 total operational cost of these stations.

Four sediment stations were again operated, designated as follows: Federal-Provincial 2, Provincial 2. The Province paid $5,925 toward the $6,411 total operational cost of this sampling program.

Maintenance at gauging stations continued at an ambitious pace. There were 4 major projects involved. At the Churchill River above Muskrat Falls station a manometer and an armoured cable orifice line was installed. The extremely long intake pipe in the stilling well, installed in 1953, had become blocked by sediment resulting in degraded record. The existing gauge shelter was used to house the instrumentation. The Waterford River station at Mount Pearl was relocated approximately 140 metres upstream. This relocation was necessary due to constant problems with shifting of the streambed at the old site. The new location was instrumented with a manometer.

At Indian Brook the gauge shelter was upgraded with new roofing and the exterior clad with shingles. This upgrading blends with the ambience of the park where the station is located. At the fly-in station on Grey River a complete new cableway was installed. Extra helicopter flying was required to transport the 3/4" cable to the site.

Cost details of these major maintenance projects are shown on page no. 8 and included with the costs shown on pages no. 5 and 6.

There was one unplanned construction project. Vandalsim in the form of arson completely destroyed the gauge shelter at Raymond Brook. The water level recorder was lost in the fire. The shelter was replaced with a metal prefabricated enclosure welded to the existing 48" diameter stilling well. Since this construction took place there has been evidence that further attempts to vandalize the structure have been thwarted. Cost details for this project are shown on page no. 9.

The Churchill River water level station at the foot of Lower Muskrat Falls was selected in support of the WRB project 2000 for the installation of new instrumentation to record high water levels created by a hanging ice dam below the falls. A SUTRON 8200 data logger equipped with a GOES Satellite Transmitter was installed, interfaced with a waterlog transducer. To protect the vented cable and transducer from being crushed by ice, the cable was housed in a metal conduit secured to the rock face by metal clamps and anchor bolts. The underwater work required the services of professional divers. Unfortunately, the "O" rings in the water log failed after approximately 4 weeks. A 50 foot manometer was then installed connected to the Sutron via a shaft encoder. A complete set of water level data was recorded during the winter season, and was available in real-time. This project was considered a Federal initiative and not shared with the Province. The cost was in the vicinity of $7,000. The plans are ongoing to reinstall a refurbished pressure transducer when one becomes available.

At the request of Abitibi-Price Inc. a special metering project was conducted on the Exploits River on May 1, 1990, in order to confirm the results of a survey conducted by WSC in 1989. The information was required to assess the accuracy of flows reported by the company and to use as a criteria for the design of the proposed Greenwood Power Development on the Exploits River. The results led to an adjustment of coefficients used to calculate flows by the Company.

In conjunction with Atmospheric Environment Service a meterological station established at the Alexis River site in Labrador. Data collected are temperature, precipitation, humidity and barametric pressure. Data are transmitted through the WSC data collection platform to the GOES service.

The upgrading and expansion program of the Humber River Basin Data Collection Network for forecasting was completed. The field activities of construction and instrumentation was carried out by WSC. Three new met stations were established to provide temperature and precipitation data. Three WSC stations were upgraded to include temperature and precipitation, and DCP's were installed at two existing WSC stations. The water level station at Main Dam was discontinued. The shelter, along with the DCP, was moved to the met site on

Sandy Lake. In summary a total of 13 stations providing real-time parameters support the data collection network. The operation and maintenance of the data network will be the responsibility of WSC under the Canada-Newfoundland Agreement on hydrometric surveys. A M.O.U. has been formulated for this activity.

As shown on page no. 18 the average cost of operating a gauging station for each year of the Agreement was compiled and adjusted to 1975-76 dollars, the first year of the Agreement, by setting the average cost for 1975-76 equal to 1.0. To compare the trend of average station costs to the National cost trend, seasonally adjusted quarterly inflation data by Statistics Canada were obtained. These quarterly values were used to calculate average national cost indices by fiscal year, all of which were brought back to 1975-76 dollars.

From the graphic that appears on page no. 19 it can be observed that increases in average station operating cost have not followed the National inflationary trends. Operating costs have been notably lower over the years. This is an indication of the efficient manner in which the network has been operated.

It should be noted however, that salaries of technical staff represent a major portion (roughly 56%) of the operating costs. Any significant change in salaries leads to a significant impact on the index for average station cost. In 1989-90 the index increased significantly over the previous year due to the intermin wage settlement for technical staff. With the upward adjustments in salaries due to the classification conversion of technical staff, the salary situation had to be addressed. To minimize the impact on the Province for 1990-91, the salary portion of operating costs was adjusted to reflect the time spent on activities outside the Water Quantity Surveys Agreement. As a result the index for average station cost for 1990-91 only moderately increased over that for 1989-90.

WATER QUANTITY SURVEYS

PROVINCE OF NEWFOUNDLAND

ISLAND 1990-91

OPERATIONAL COSTS FOR HYDROMETRIC SURVEYS

	Estimated	Actual
Personnel - Basic Pay - 01, 02, 03 (Salaries of hydrometric technical staff including overtime	$254,100	$248,345
Transportation and Communications		
Travel and Removal - 04	23,000	$21,424
Transportation and Postage - 06	2,000	1,556
Telecommunications -07	NIL	1,429
Professional and Special Services		
Professional Services - 11	1,200	1,714
Other Services - 15	6,000	8,595
Rentals		
Rentals - 16	43,000	47,901
Purchased Repair and Upkeep		
Equipment Purchased and Repairs - 17	5,000	4,726
Building and Structures Repairs - 18	1,000	140
Utilities, Materials and Supplies		
Public Utility Services - 19	2,000	1,540
Purchased Materials - 20	20,000	17,842
Parts and Consumable Tools - 21	10,000	14,396
Other Costs - Data Processing	10,200	10,172
- Depreciation of Vehicles (6)	15,500	15,952
- Depreciation of Field Equipment and Instruments	12,000	7,134
TOTAL	$405,000	$402,866

WATER QUANTITY SURVEYS

PROVINCE OF NEWFOUNDLAND

LABRADOR - 1990-91

OPERATIONAL COSTS FOR HYDROMETRIC SURVEYS

	Estimated	Actual
Personnel - Basic Pay - 01, 02, 03 (Salaries of hydrometric technical staff including overtime)	$48,100	$58,192
Transportation and Communication		
Travel and Removal - 04	$12,000	$13,822
Transportation and Postage - 06	2,000	1,229
Telecommunications - 07	NIL	83
Professional and Special Services		
Professional Services - 11	NIL	---
Other Purchased Services - 15	2,000	821
Rentals		
Rentals - 16	53,000	65,033
Purchased Repair and Upkeep		
Equipment Purchased and Repairs - 17	500	247
Building and Structure Repairs - 18	NIL	---
Utilities, Materials and Supplies		
Public Utility Services - 19	NIL	---
Purchased Materials - 20	2,000	1,198
Parts and Consumable Tools - 21	1,000	1,855
Other Costs - Data Processing Costs	1,500	1,496
- Depreciation of Field Equipment and Instruments	2,000	2,037
TOTAL	$124,100	$146,013

WATER QUANTITY SURVEYS

PROVINCE OF NEWFOUNDLAND

1990-91

OPERATIONAL COSTS FOR SEDIMENT SURVEYS

	Estimated	Actual
Personnel - Basic Pay - 01, 02, 03	NIL	---
Transportation and Communication		
Travel and Removal - 04	$ 500	195
Transportation and Postage - 06	500	361
Telecommunications - 07	NIL	---
Professional and Special Services		
Professional Services - 11	1,000	510
Other Purchased Services - 15	100	4
Rentals		
Rentals - 16	NIL	---
Purchased Repair and Upkeep		
Equipment Purchased and Repairs - 17	200	---
Building and Structure Repairs - 18	NIL	---
Utilities, Materials and Supplies		
Public Utility Services - 19	NIL	---
Purchased Materials - 20	500	313
Parts and Consumable Tools - 21	100	---
Other Costs - Sample Analysis	4,000	3,915
- Depreciation of Field Equipment and Instruments	1,000	1,113
TOTAL	$ 7,900	$ 6,411

MAJOR MAINTENANCE PROJECTS

NEWFOUNDLAND

1990-91

STATION	PROJECT		COSTS
Waterford River at Mount Pearl	Relcation of station upstream and installing manometer	Boomtruck	$ 875
		Materials	232
		Total	$1,106
Grey River near Grey River	Replacement of cableway with new A-frame and cable	Travel	$ 259
		Helicopter	1,200
		Services/ Labour	719
		Materials	471
		Parts	$2,226
		Total	$4,875
Indian Brook at Indian Falls	Upgrading of shelter with new roof, door and shingle siding	Travel	$ 300
		Materials	426
		Total	$ 726
Churchill River above Upper Muskrat Falls	Install manometer with armoured cable orifice	Travel	$ 997
		Labour	93
		Helicopter	500
		Materials	$ 150
		Total	$1,744

NOTE: All costs associated with the above projects have been included with the operational costs shown on page no. 5 for Island stations and page no. 6 for the Churchill River station.

CONSTRUCTION PROGRAM COSTS

NEWFOUNDLAND

1990-91

STATION NAME	CAPITAL		O&M		CLASS.	SHARE FED.	SHARE PROV.
Raymond Brook at Outlet of Bay Bulls Big Pond	Contractor (fabricate shelter)	$995	Travel	$ 221	P		
			Rentals	165			
			Contractor (transport & install)	995			
			Materials	156			
Totals		$995		$1,537		$0	$2,532

WATER QUANTITY SURVEYS

PROVINCE OF NEWFOUNDLAND

SUMMARY OF ANNUAL COSTS AND PAYMENTS RECEIVED - 1990-91

HYDROMETRIC SURVEYS

Island

Station Classification	Stations	Stations Units
F1	6	6.0
F4	11	11.0
FP3	40	40.0
P1	28	25.6*
Totals	85	82.6

Average Cost/Station Unit = $402,866/82.6 = $4,877

Provincial Share = 50% of 40.0 x $4,877 + 100% of 25.6 x $4,877 = $222,391

Labrador

Station Classification	Stations	Station Units
F2	2	2.0
F4	4	4.0
FP3	3	3.0
P1	4	1.7**
	13	10.7

Average Cost/Station Unit = $146,013/10.7 = $13,646

Provincial Share = 50% of 3.0 x $13,646 + 100% of 1.7 x $13,646 = $43,667

Provincial Share of Operational Costs for Hydrometric Surveys on the Island and Labrador ($222,391 + 43,667)	$266,058
Provincial Payment Received for Operational Costs for Hydrometric Surveys per Schedule "D"	$260,691

* Includes 4 WL stations (Deer Lake, Corner Brook Lake, Grand Lake (2) @ 0.4 station units

** Includes 3 Churchill River WL stations @ 0.4 station units and North Brook seasonal station @ 0.5 station units.

SEDIMENT SURVEYS

Station Distribution	Stations
Federal-Provincial	2
Provincial	2
Total	4

Average Cost/Station = $6,411 = $1,603

Provincial Share of Operational Costs for Sediment Surveys

50% of 2 x $1,603 + 100% of 2 x $1,603	$ 4,809
Provincial Payment Received for Operational Costs for Sediment Surveys per Schedule "D"	$ 5,925

CONSTRUCTION

Total Cost of Constructing Raymond Brook station (See Page no. 9 for details of construction costs) - $2,532

Provincial Share of Construction Costs	$ 2,532
Provincial Payment Received for Construction per Schedule "D"	$ 0

DATA COLLECTION PLATFORMS

Annual Imputed Rental for Recovery of Costs from Purchase of 14 DCPs	$ 11,678
Provincial Payment Received for DCPs per Schedule "D"	$ 11,678

METEOROLOGICAL STATIONS

Operational Services Relating to Humber River Meteorological Stations	$ 2,000
Provincial Payment Received for Meteorological Stations	$ 2,000

TOTALS

Total Provincial Share for Operations, Construction DCP's and Met Stations ($266,058 + $4,809 + $2,532 + $11,678 + $2,000)	$287,077
Total Provincial Payment Received for Operations, Construction, DCPs and Met Stations per Schedule "D" ($260,691 + $5,925 + $0 + $11,678 + $2,000)	$280,294

Province/Territory: *NEWFOUNDLAND*

TABLE 1
WATER QUANTITY SURVEYS
GAUGING STATION DATA FOR *1990-91*

No. of Stations			Changes during *1990-91*		Stn. Designation April 1, *1990*			
April 1 *89*	April 1 *90*	Change	Added	Discontinued	Fed.	F P	Prov.	Contrib.
111	*112*	*1*	*0*	*0*	* *23*	* *43* *(2)*	* *32* *(2)*	*14*

* Bracket Sediment Stations

TABLE 2
WATER QUANTITY SURVEYS
COMPARATIVE GAUGING STATION DATA April 1/75 - *April 1/90*

Federal Stations			F P Stations			Provincial Stations			Total Stations		
Apr 1 75	Apr 1 *90*	Chge	Apr 1 75	Apr 1 *90*	Chge	Apr 1 75	Apr 1 *90*	Chge	Apr 1/75	Apr 1/*90*	Chge
14	*23*	*9*	*7*	*43*	*36*	*9*	*32*	*23*	*30*	*98*	*68*

TABLE 3
WATER QUANTITY SURVEYS
DETAILED GAUGING STATION DATA *1990-91*

F-1	F-2	F-3	F-4	Total F	FP-1	FP-2	FP-3	Total F/P	P-1	P-2	Total P	Contributed	Total-All
6	*2*	*0*	*15*	*23*	*0*	*0*	*43* *(2)*	*43* *(2)*	*32* *(2)*	*0*	*32* *(2)*	*14*	*112* *(4)*

Bracket Sediment Stations in all catagories

Province: NEWFOUNDLAND

TABLE 4
WATER QUANTITY SURVEYS
TOTAL PROGRAM COSTS & SHAREABLE COSTS FOR 1990-91
(× $1000)

Total Program Costs					Shareable Costs						
P/Yrs	Sal.	Oper.	Cap.	Total	P/Yrs	Sal.	Oper.	Const.	Total	F Share	P Share
12.33	613.4	295.5	49.9	958.8	7.00	306.5	248.8	2.5	557.8	286.9	270.9

TABLE 5
WATER QUANTITY SURVEYS
SUMMARY OF SCHEDULES D/F- 1990-91

Streamflow & Water Level		Sediment		Total
Operation	Construction	Operation	Construction	
260 691	0	59 25	0	266 616

TABLE 6
WATER QUANTITY SURVEYS
COMPARISON - SCHEDULED & ACTUAL COSTS FOR 1990-91
(Dollars)

Salary & Operations		Construction		Total			Annual Payment Received	Received Minus Actual
Sch. D/F	Actual Cost	Sch. D/F	Actual Cost	Sch. D/F	Actual Cost	Difference		
266 616	270 867	0	2 532	266 616	273 399	6 783	266 616	-6 783

SUMMARY OF ANNUAL COSTS AND PAYMENTS

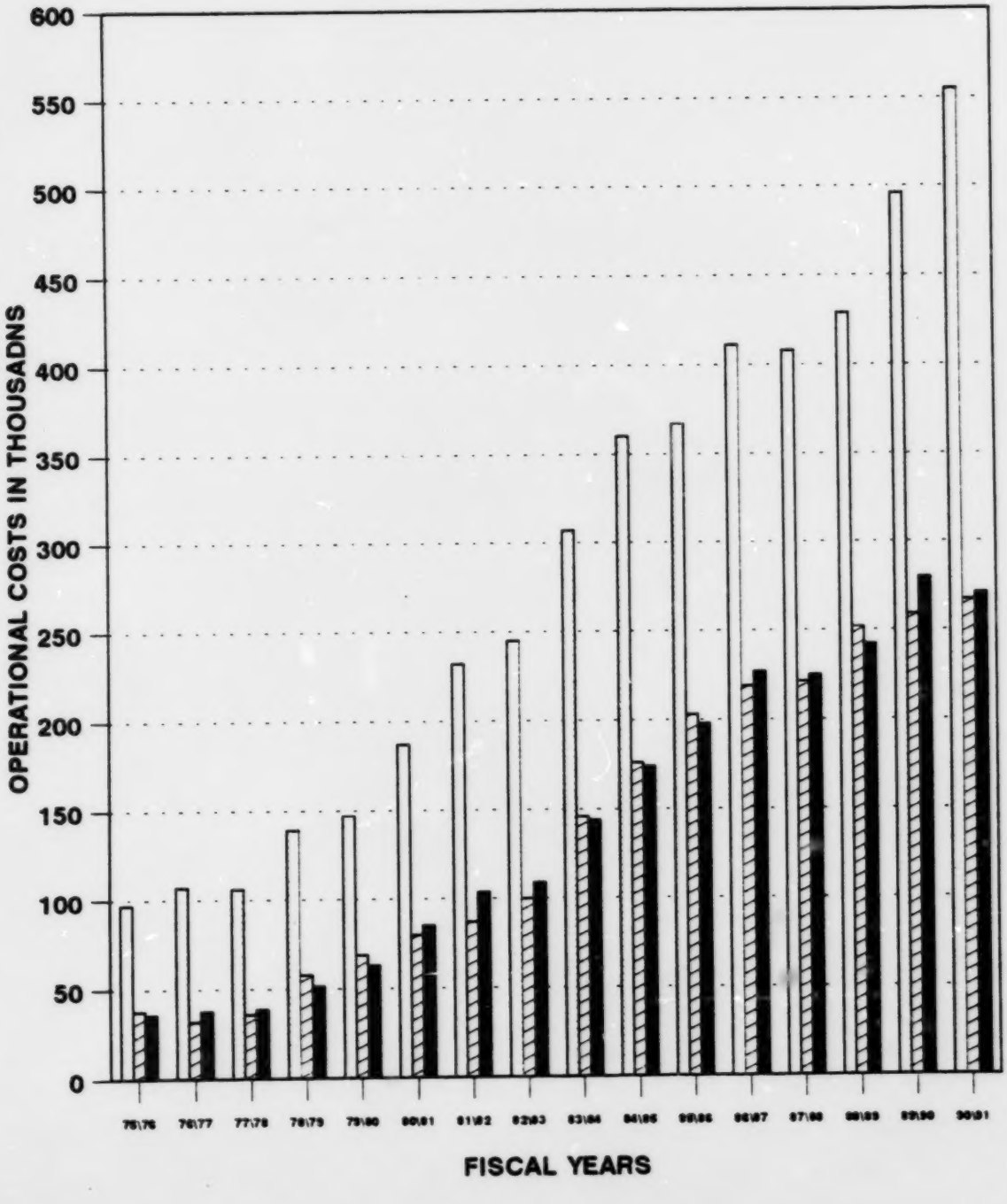
1975-76 TO 1990-91

NEWFOUNDLAND

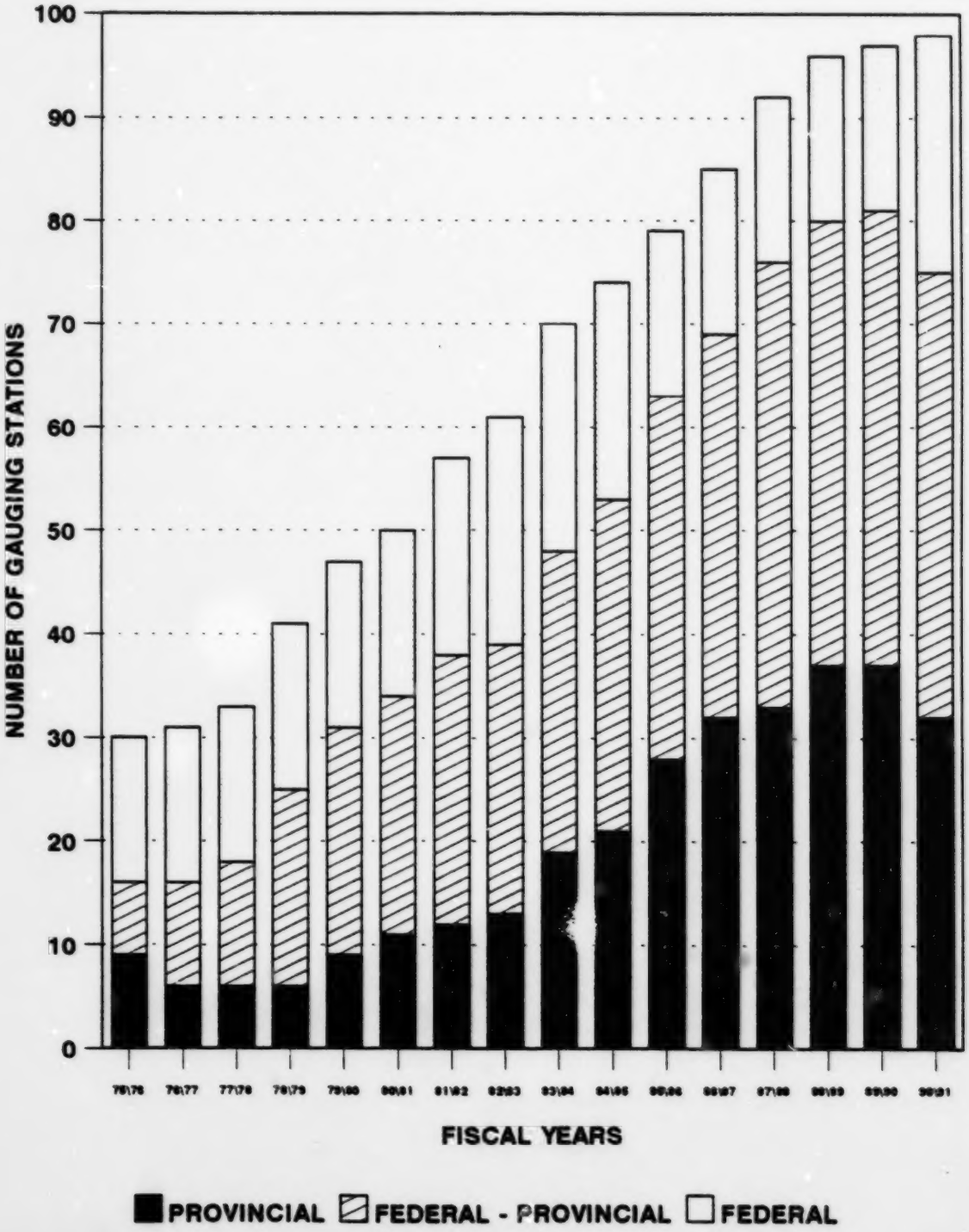
	SCHEDULE "D"				ACTUAL PROVINCIAL SHARE				
YEAR	HYDROMET	SEDIMENT	CONSTR	TOTAL	HYDROMET	SEDIMENT	CONSTR	TOTAL	+CREDIT/DEBIT-
1975-76	37,800	-	3,600	41,400	36,283	-	2,117	38,415	+2,985
1976-77	32,340	-	12,000	44,340	37,840	-	1,573	39,413	+4,927
1977-78	35,520	-	24,480	60,000	38,700	-	13,963	52,663	+7,337
1978-79	56,775	1,400	11,825	70,000	51,371	679	26,000	78,050	+8,050
1979-80	68,338	933	25,729	95,000	62,256	896	22,476	85,628	+9,372
1980-81	78,639	1,475	6,000	86,114	83,518	1,064	7,703	92,285	-6,171
1981-82	83,523	3,750	14,000	101,273	100,726	3,114	16,560	120,400	-19,127
1982-83	96,542	3,744	55,000	155,286	102,735	5,886	47,224	155,845	-559
1983-84	141,457	4,470	38,000	183,927	136,917	6,906	37,864	181,687	+2,240
1984-85	168,244	7,350	52,000	227,594	168,247	5,295	48,662	222,204	+5,390
1985-86	195,563	7,650	36,787	240,000	191,580	6,324	39,203	237,107	+2,893
1986-87	211,706	6,975	34,641	253,322*	222,843	4,413	35,136	262,392	-9,070
1987-88	213,634	6,975	42,000	262,609*	220,934	3,597	47,957	272,488	9,879
1988-89	245,221	6,300	15,000	266,521*	237,249	4,083	16,148	258,080	+8,441
1989-90	253,392	5,175	30,000	288,567*	274,004	5,571	21,264	300,839	-12,272
1990-91	260,691	5,925	--	266,616**	266,058	4,809	2,532	273,399	- 6,783
							NET		-28,326

NOTE: *Not including $11,678 payment for IMPUTED RENTAL OF 14 DCPS
**Not including $11,678 DCP payment plus $2,000 for operation of Humber River met sites.

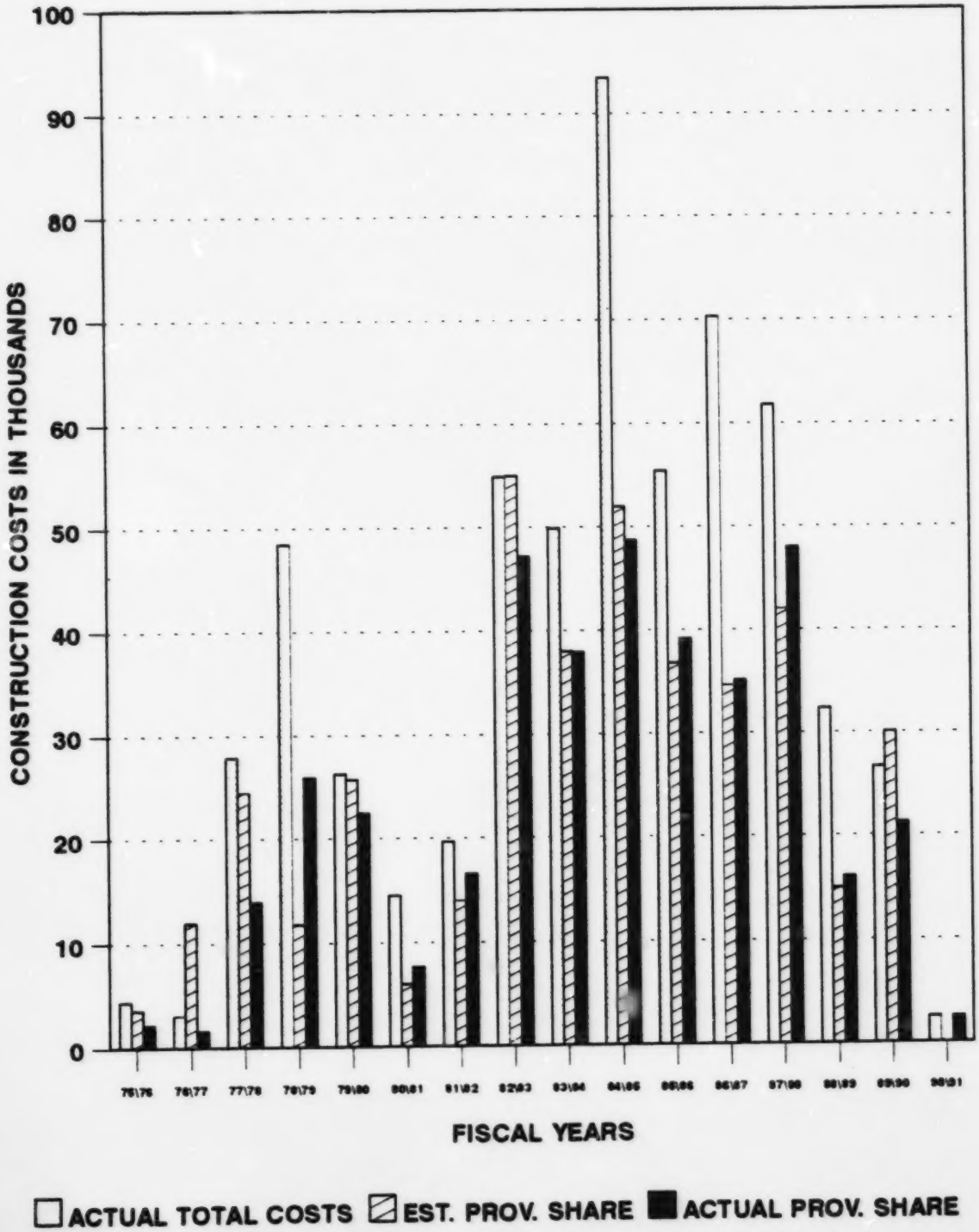
WATER QUANTITY SURVEYS
NEWFOUNDLAND & LABRADOR
OPERATIONAL COSTS



WATER QUANTITY SURVEYS
NEWFOUNDLAND & LABRADOR
GAUGING STATIONS OPERATED



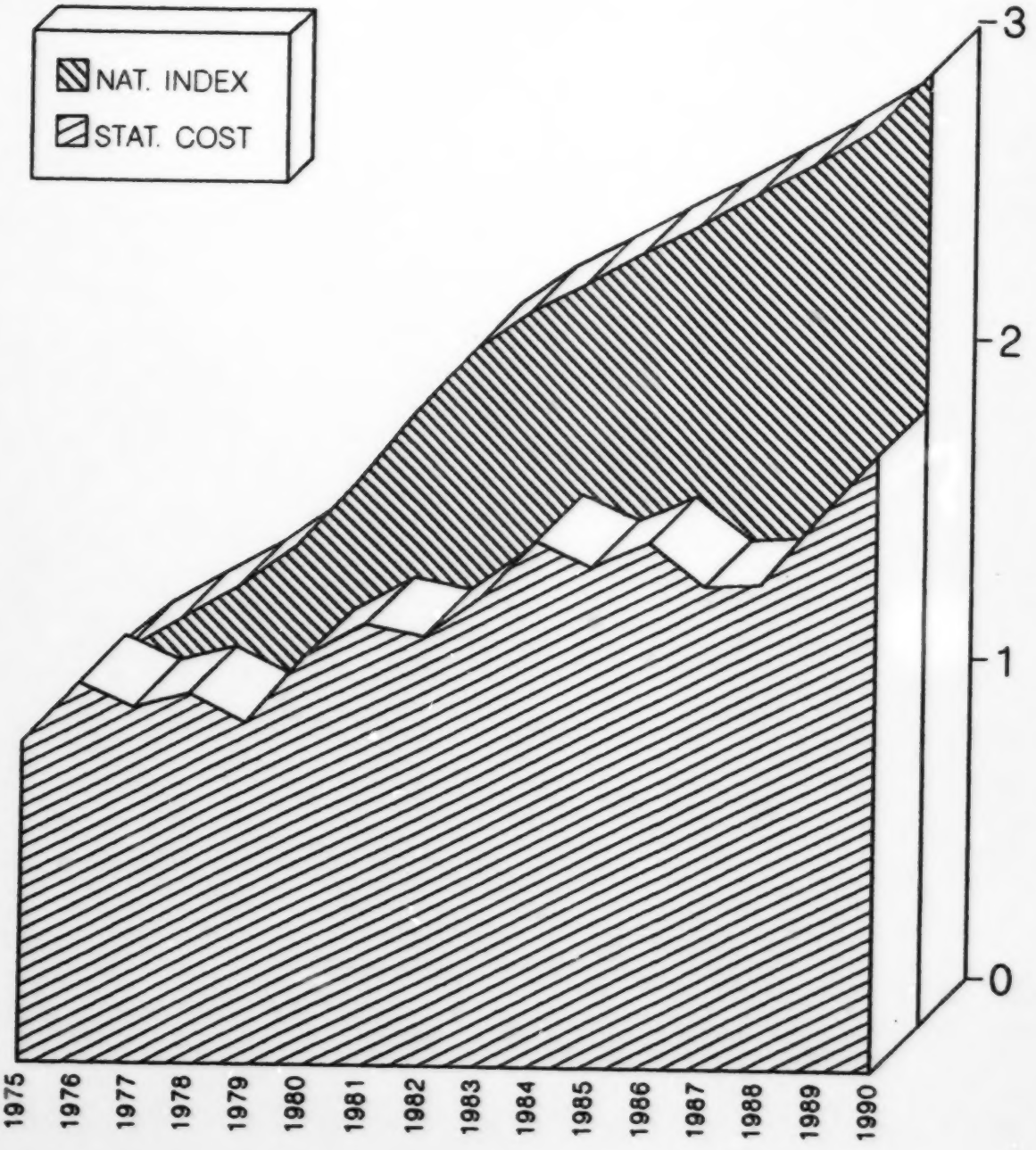
WATER QUANTITY SURVEYS
NEWFOUNDLAND & LABRADOR
CONSTRUCTION COSTS



NEWFOUNDLAND
COMPARISON OF AVERAGE STATION OPERATING COST
TO NATIONAL COST TREND

Year	No. Sta.	Avg. Sta. Cost (Island & Labrador)	Sta. Cost Index Using 1975-76 Dollars	Modified National Cost Index Using 1975-76 Dollars
1975-76	30	2,899	1.00	1.00
1976-77	31	3,440	1.19	1.14
1977-78	33	3,225	1.11	1.24
1978-79	41	3,352	1.16	1.34
1979-80	47	3,095	1.07	1.47
1980-81	50	3,699	1.28	1.67
1981-82	57	3,999	1.38	1.90
1982-83	61	3,894	1.34	2.09
1983-84	70	4,254	1.47	2.21
1984-85	74	4,770	1.65	2.30
1985-86	79	4,543	1.57	2.40
1986-87	85	4,766	1.64	2.49
1987-88	92	4,380	1.51	2.59
1988-89	96	4,407	1.52	2.69
1989-90	97	5,037	1.74	2.80
1990-91	98	5,600	1.93	2.98

COST TREND ANALYSIS
STATION COST vs NATIONAL COST INDEX
NEWFOUNDLAND AND LABRADOR



1975 BASE VALUE OF 1.0

APPENDIX NO. I

MEMORANDUM OF AGREEMENT

(Sample only)

MEMORANDUM OF AGREEMENT made this twenty-fifth day of February, 1975,

BETWEEN:

The Government of Canada, hereinafter called "Canada", represented by the Minister of the Environment

OF THE FIRST PART

- and -

The Government of the Province of Newfoundland and Labrador hereinafter called the "Province" represented by the Minister responsible for Provincial Affairs and Environment

OF THE SECOND PART

WHEREAS co-operative water quantity surveys have been carried on for many years under various informal federal-provincial agreements in the Provinces of Canada by the Water Survey of Canada of the Department of the Environment, for the purpose of securing co-ordinated and standardized basic data to facilitate resource planning and management in general and the design and implementation of projects related to navigation, hydro-electric development, irrigation, drainage, flood control, recreation, domestic and industrial water supply and other purposes;

AND WHEREAS the Governor-in-Council has by Order-in-Council NO. PC 1975-1/172 dated January 28, 1975, authorized the Minister of Environment to execute this agreement on behalf of Canada, subject to funds being voted by the Parliament of Canada;

AND WHEREAS the Lieutenant Governor in Council has, by Order-in-Council No. 1412-74 dated December 5, 1974, authorized the Minister responsible for Provincial Affairs and Environment to execute this agreement on behalf of the Province subject to funds being voted by the Legislative Assembly.

NOW THEREFORE this agreement witnesseth that water quantity surveys in the Province and the financing thereof shall be continued and maintained upon the following basis; -

DEFINITIONS

a) ANNUAL PAYMENT - a sum, agreed to by both parties in advance of the fiscal year, which shall represent the costs of operation and construction of water quantity survey stations.

b) CONSTRUCTION - includes the construction of new water quantity survey stations and the maintenance, repair and reconstruction of existing water quantity survey stations.

c) CONSTRUCTION PERSONNEL - includes foremen and labourers on full time duty as well as engineering and technical staff on part time supervisory duty or reconnaissance assignment.

d) FIELD PERSONNEL - includes hydrometric supervisors and field technicians on full time duty as well as engineering and technical staff on temporary assignment.

e) NETWORKS - an original system of gauging stations for collection of water quantity survey data.

f) OPERATING PARTY - either party to this agreement which operates water quantity survey data.

g) PUBLISHED DATA - includes streamflow, water level and sediment data. The data is to be available in publications and computer compatible data files.

h) SEDIMENT STATIONS - any location where surveys are undertaken to collect data on suspended sediment or bed material or bed load data singly or in combination. Water temperature data is to be collected.

i) WATER QUANTITY SURVEY STATIONS - any location where surveys are undertaken to collect stream-flow or water level or suspended sediment or bed material or bed load data singly or in combination. Water temperature data may be collected.

OPERATIONAL CONSIDERATIONS

ARTICLE I

Each water quantity survey station presently in operation has been identified according to the designation federal, federal-provincial or provincial. The current designation is given in Schedule A, hereto attached. Schedule A may be revised to include a change in the designation of a station, the addition of new stations or the deletion of stations as agreed by the Co-ordinating Committee (Article XII) and approved by the officials named in Article XIII.

ARTICLE II

Canada will construct and operate and pay the cost of construction and the annual cost of operation of water quantity survey stations which have been designated as federal. Where Canada deems it desirable in the interest of efficiency of operation, the Province may be requested to construct and operate some federal water quantity survey stations. If the Province agrees to such arrangements, Canada would in such cases reimburse the Province for the cost of construction and annual cost of operation in accordance with Article VI.

ARTICLE III

Where Canada constructs and operates water quantity survey stations designated as federal-provincial, the Province will reimburse Canada for 50% of the construction costs and 50% of the annual cost of operation. Where the Province constructs and operates these stations, Canada will reimburse the Province for 50% of the construction costs and 50% of the annual cost of operation in accordance with Article VI.

ARTICLE IV

If requested by the Province, Canada will construct and operate water quantity survey stations designated as provincial provided the Province reimburses Canada for 100% of the construction cost and annual cost of operation. If the Province constructs and operates these stations the Province will assume 100% of the annual cost of construction and operation in accordance with Article VI.

ARTICLE V

a) The operating party shall provide the staff to meet its responsibilities under this agreement.

b) Canada will at its own expense publish data from stations that it operates. Canada will on request at its own expense, publish data from stations operated by the Province providing the data meets national standards.

c) Water quantity surveys under this agreement shall be carried out to national standards in field procedures, equipment and instrumentation, data compilation and will use national guidelines for station designations. Such standards and guidelines shall be developed and maintained by Canada in consultation with all of the Provinces.

d) Canada and the Province shall work together to take advantage of technological advancements which improve the quality of data and the efficiency of standard procedures and to develop methods and techniques to assist in planning water quantity survey networks.

e) Canada at its own expense will provide calibration service for water quantity survey velocity instruments for both parties.

FINANCIAL CONSIDERATIONS

ARTICLE VI

a) Procedures for computing the annual payment are given in Schedule C.

b) The annual payment for 1975-76 is set out in Schedule D. The annual payment for subsequent years shall be determined according to the terms of this agreement and the procedures as set out in Schedule C.

c) Annual operation costs, except for sediment stations, will be computed using average annual water quantity survey station costs and the number of stations to be operated. The average annual water quantity survey station costs shall be recomputed annually according to the items listed in Schedule B.

d) Annual construction costs, except for sediment stations, will be the cost of constructing new water quantity survey stations plus repairs to and major reconstruction of existing water quantity survey stations.

e) The annual operation costs for sediment stations will be the summation of the individual station operation costs.

f) The annual construction costs of sediment stations will be the cost of constructing new sediment stations plus repairs to and major reconstruction of existing stations.

ARTICLE VII

a) The party operating the water quantity survey stations in accordance with Articles II, III and IV, will be responsible for providing and paying the total cost of water level recording equipment.

b) All costs associated with the purchase, installation and operation of specialized water quantity survey equipment will be paid for by the party or parties requiring the service.

ARTICLE VIII

Canada or the Province, depending on the operating responsibilities, shall submit invoices for one-quarter of the annual payment on July 1st., October 1st., January 1st. and March 1st. of each fiscal year in accordance with the annual payment set out in Schedule D. Payment is to be made as soon as possible after receipt of each quarterly claim but in no case later than March 31st. of each year.

ARTICLE IX

Except as agreed by the parties hereto where both parties have an interest, either operational or financial, the annual net change in the total number of water quantity survey stations, including federal, federal-provincial and provincial, as set out in Schedule A, is not to exceed 15% in any year.

ARTICLE X

Each party constructing or operating a water quantity survey station or stations shall keep complete records of all shareable expenditures made pursuant to this agreement and shall support such expenditures with proper documentation. Canada and the Province upon request shall make these records and documents available to auditors appointed by each other.

CO-OPERATION

ARTICLE XI

There shall be a free exchange of water quantity survey data between Canada and the Province. The party operating the water quantity survey station shall retain originals or a microfilm copy of observations, measurements, recorder charts and computations and these are to be available to the the other party on request.

CO-ORDINATION

ARTICLE XII

The officials named in Article XIII shall establish a Co-ordinating Committee representing each of the parties affected by this agreement. The Co-ordinating Committee shall be responsible for:

a) Planning and the continuing review of water quantity survey networks, including addition and deletion of all stations within Provincial boundaries.

b) Determining and reviewing the designation of water quantity survey stations using national guidelines which may from time to time be changed, subject to ratification by Canada and all of the Provinces.

c) Assuring the maintenance of standards in procedures, data compilation and instrumentation.

d) Reviewing annual operating costs and establishing average annual station costs, as per Article VI, for revision of Schedule D.

e) Preparation annually of new Schedule A and D which with the approval of the officials named in Article XIII would apply for the second and each subsequent year of the agreement.

The committee shall meet at least once a year and shall report to the officials named in Article XIII.

ADMINISTRATIVE ARRANGEMENTS

ARTICLE XIII

This agreement is to be administered for Canada by the Regional Director of the Inland Waters Directorate located at Halifax, Nova Scotia, and for the Province by the Assistant Deputy Minister, Environment, located at St. John's, Newfoundland.

IMPLEMENTATION

ARTICLE XIV

The parties hereto agree that water quantity surveys will be carried out at indicated in Article I to XIII inclusive and the Schedules attached hereto.

PERIOD OF AGREEMENT

ARTICLE XV

This agreement shall become effective and binding on the parties upon the first day of April, 1975.

The agreement may be terminated by Canada or the Province on March 31st of any year provided that eighteen (18) months notice in writing is given. The agreement may be revised with the consent of the Governor-in-Council and the Lieutenant Governor-in-Council.

IN WITNESS WHEREOF the Honourable Jeanne Sauve, Minister of Environment has hereunto set her hand on behalf of Canada, and the Honourable W. Gorden Dawe, Minister of Provincial Affairs and Environment has hereunto set his hand on behalf of the Province of Newfoundland and Labrador.

Signed on behalf of Canada)
by the Honourable Jeanne Sauve)
Minister of Environment)..........

IN THE PRESENCE OF)

.....)

Signed on behalf of the Province of)
Newfoundland and Labrador by the)
Honourable W. Gorden Dawe, Minister)
of Provincial Affairs and Environment)..........

IN THE PRESENCE OF)

)
)
.....

APPENDIX II

SCHEDULE A

WATER QUANTITY SURVEY STATIONS

FEDERAL 1 FEDERAL DEPARTMENTAL PROGRAMS

STA. NO.	STATION NAME	ESTAB.	D.A.	RECORDS	REMARKS
02YH001	BOTTOM CREEK NEAR ROCKY HARBOUR	1985	33.4	Q R C	
02ZB001	ISLE AUX MORTS RIVER BELOW HIGHWAY BRIDGE	1962	205	Q R C	DCP TYP LRTA
02ZM006	NORTHEAST POND RIVER AT NORTHEAST POND	1953	3.63	Q R C	
02ZK001	ROCKY RIVER NEAR COLINET	1948	285	Q R C	DCP TYP WQ
02YS003	SOUTHWEST BROOK AT TERRA NOVA NATIONAL PARK	1967	36.7	Q R C	
02YL001	UPPER HUMBER RIVER NEAR REIDVILLE	1928	2110	Q R C	DCP TYP

FEDERAL 2 INTERPROVINCIAL WATERS

STA. NO.	STATION NAME	ESTAB.	D.A.	RECORDS	REMARKS
02XA003	LITTLE MECATINA RIVER ABOVE LAC FOURMONT	1979	4540	Q R C	DCP RMT
02XA004	RIVIERE JOIR NEAR PROVINCIAL BOUNDARY	1980	2060	Q R C	RMT

FEDERAL 4 NATIONAL WATER QUANTITY INVENTORY

STA. No.	STATION NAME	ESTAB.	D.A.	RECORDS	REMARKS
02ZF001	BAY DU NORD RIVER AT BIG FALLS	1950	1170	Q R C	DCP
03OE001	CHURCHILL RIVER ABOVE UPPER MUSKRAT FALLS	1948	92500	Q R C	DCP RMT REG7 WQ
03QC001	EAGLE RIVER ABOVE FALLS	1966	10900	Q R C	DCP RMT WQ T
02YO005	EXPLOITS RIVER BELOW STONY BROOK	1969	8640	Q R C	REG WQ
02YQ001	GANDER RIVER AT BIG CHUTE	1949	4400	Q R C	DCP TYP
02ZG001	GARNISH RIVER NEAR GARNISH	1958	205	Q R C	LRTAP
02ZD002	GREY RIVER NEAR GREY RIVER	1969	1340	Q R C	DCP RMT LRTA MET
02YJ001	HARRYS RIVER BELOW HIGHWAY BRIDGE	1968	640	Q R C	DCP SED WQ LRTAP
02YL003	HUMBER RIVER AT HUMBER VILLAGE BRIDGE	1982	7860	Q R C	DCP REG
02YG001	MAIN RIVER AT PARADISE POOL	1986	627	Q R C	DCP RMT
03PB002	NASKAUPI RIVER BELOW NASKAUPI LAKE	1978	4480	Q R C	RMT
02YD002	NORTHEAST BROOK NEAR RODDICKTON	1980	200	Q R C	SED
02YS005	TERRA NOVA RIVER AT GLOVERTOWN	1985	2000	Q R C	DCP
02YC001	TORRENT RIVER AT BRISTOL'S POOL	1959	624	Q R C	WQ
03NF001	UGJOKTOK RIVER BELOW HARP LAKE	1979	7570	Q R C	RMT

FEDERAL-PROVINCIAL 3 REGIONAL WATER QUANTITY INVENTORY

STA. NO.	STATION NAME	ESTAB.	D.A.	RECORDS	REMARKS
03QC002	ALEXIS RIVER NEAR PORT HOPE SIMPSON	1978	2310	Q R C	DCP RMT MET
02YA002	BARTLETTS RIVER NEAR ST. ANTHONY	1986	33.6	Q R C	DCP
02YJ002	BLANCHE BROOK NEAR STEPHENVILLE	1978	120	Q R C	REG
02ZH002	COME BY CHANCE RIVER NEAR GOOBIES	1961	43.3	Q R C	
02ZE004	CONNE RIVER AT OUTLET OF CONNE RIVER POND	1988	99.5	Q R C	
02YO011	EXPLOITS RIVER BELOW NOEL PAULS BROOK	1985	6300	Q R C	DCP REG
02ZC002	GRANDY BROOK BELOW TOP POND BROOK	1982	230	Q R C	DCP RMT LRTA
02YO008	GREAT RATTLING BROOK ABOVE TOTE RIVER CONFLUENCE	1984	823	Q R C	DCP
02YE001	GREAVETT BROOK ABOVE PORTLAND CREEK POND	1983	95.7	Q R C	
02ZA002	HIGHLANDS RIVER AT TRANS-CANADA HIGHWAY	1982	72.0	Q R C	SED
02YR003	INDIAN BAY BROOK NEAR NORTHEAST ARM	1981	554	Q R C	
02YM001	INDIAN BROOK AT INDIAN FALLS	1954	974	Q R C	WQ LRTAP REG
02YO010	JUNCTION BROOK NEAR BADGER	1985	61.6	Q R C	
03NG001	KANAIRIKTOK RIVER BELOW SNEGAMOOK LAKE	1979	8930	Q R C	DCP RMT
02YK002	LEWASEECHJEECH BROOK AT LITTLE GRAND LAKE	1952	470	Q R C	DCP RMT
02ZA001	LITTLE BARACHOIS BROOK NEAR ST. GEORGE'S	1978	343	Q R C	
02YN002	LLOYDS RIVER BELOW KING GEORGE IV LAKE	1980	469	Q R C	RMT
02YR001	MIDDLE BROOK NEAR GAMBO	1959	267	Q R C	
03OE003	MINIPI RIVER BELOW MINIPI LAKE	1979	2330	Q R C	DCP RMT
02ZK002	NORTHEAST RIVER NEAR PLACENTIA	1979	89.6	Q R C	
02ZN001	NORTHWEST BROOK AT NORTHWEST POND	1966	53.3	Q R C	RMT
02YQ004	NORTHWEST GANDER RIVER NEAR GANDER LAKE	1983	2150	Q R C	RMT
02YJ003	PINCHGUT BROOK AT OUTLET OF PINCHGUT LAKE	1986	119	Q R C	
02ZH001	PIPERS HOLE RIVER AT MOTHERS BROOK	1952	764	Q R C	WQ LRTAP
02YR002	RAGGED HARBOUR RIVER NEAR MUSGRAVE HARBOUR	1977	399	Q R C	
02YL005	RATTLER BROOK NEAR MCIVERS	1985	17.0	Q R C	
02YQ005	SALMON RIVER NEAR GLENWOOD	1987	80.8	Q R C	
02ZG003	SALMONIER RIVER NEAR LAMALINE	1980	115	Q R C	
02ZM009	SEAL COVE BROOK NEAR CAPPAHAYDEN	1979	53.6	Q R C	
02YK005	SHEFFIELD BROOK NEAR TRANS-CANADA HIGHWAY	1972	391	Q R C	DCP
02ZJ003	SHOAL HARBOUR RIVER NEAR CLARENVILLE	1985	106	Q R C	
02ZM016	SOUTH RIVER NEAR HOLYROOD	1983	17.3	Q R C	
02ZJ001	SOUTHERN BAY RIVER NEAR SOUTHERN BAY	1976	67.4	Q R C	
02YO012	SOUTHWEST BROOK AT LEWISPORTE	1989	47.7	Q R C	
02YM003	SOUTH WEST BROOK NEAR BAIE VERTE	1980	93.2	Q R C	
02YQ006	SOUTHWEST GANDER RIVER BELOW LARSON FALLS	1987	531	Q R C	RMT
02ZL003	SPOUT COVE BROOK NEAR SPOUT COVE	1979	10.8	Q R C	
02YN003	STAR BROOK BELOW STAR LAKE	1987	427	Q R C	RMT DCP
02YA001	STE. GENEVIEVE RIVER NEAR FORRESTERS POINT	1969	306	Q R C	
02ZG002	TIDES BROOK BELOW FRESHWATER POND	1977	166	Q R C	DCP
02YL008	UPPER HUMBER RIVER ABOVE BLACK BROOK	1988	471	Q R C	RMT DCP
02ZM018	VIRGINIA RIVER AT PLEASANTVILLE	1984	10.7	Q R C	
02ZM008	WATERFORD RIVER AT KILBRIDE	1974	52.7	Q R C	SED

PROVINCIAL 1 PROVINCIAL DEPARTMENTAL PROGRAM

STA. NO	STATION NAME	ESTAB.	D.A.	RECORDS	REMARKS
02ZL005	BIG BROOK AT LEAD COVE	1985	11.2	Q R C	
02YK008	BOOT BROOK AT TRANS-CANADA HIGHWAY	1985	20.4	Q R C	
03OE007	CHURCHILL RIVER AT FOOT OF LOWER MUSKRAT FALLS	1980		H R C	REG71 RMT DCP
03OE008	CHURCHILL RIVER AT GRIZZLE RAPIDS	1988		H R C	REG71 RMT
03OE005	CHURCHILL RIVER BETWEEN UPPER AND LOWER MUSKRAT FALLS	1978		H R C	REG71 RMT
02YL009	CORNER BROOK LAKE AT LAKE OUTLET	1990		H R C	REG DCP MET
02YL007	DEER LAKE AT DEER LAKE	1987		H R C	
02YK007	GLIDE BROOK BELOW GLIDE LAKE	1984	112	Q R C	
02YK009	GRAND LAKE AT MAIN DAM	1988		H R C	DCP
02YK010	GRAND LAKE EAST OF GRAND LAKE BROOK	1988		H R C	DCP RMT
02YM004	INDIAN BROOK DIVERSION ABOVE BIRCHY LAKE	1990		Q R C	DCP
02ZM020	LEARY BROOK AT PRINCE PHILIP DRIVE	1985	17.8	Q R C	
02ZM017	LEARY BROOK AT ST. JOHN'S	1983	15.3	Q R C	
02YO007	LEECH BROOK NEAR GRAND FALLS	1984	88.3	Q R C	
02ZK003	LITTLE BARACHOIS RIVER NEAR PLACENTIA	1983	37.2	Q R C	
02ZG005	LITTLE BARASWAY BROOK NEAR MOLLIERS	1987	28.2	Q R C	
02ZA003	LITTLE CODROY RIVER NEAR DOYLES	1982	139	Q R C	
02ZK004	LITTLE SALMONIER RIVER NEAR NORTH HARBOUR	1983	104	Q R C	
02YG002	MIDDLE ARM BROOK BELOW FLATWATER POND	1987	224	Q R C	
02XD002	NORTH BROOK NEAR RED BAY	1984	35.5	Q R S	RMT
02YO006	PETERS RIVER NEAR BOTWOOD	1981	177	Q R C	
02ZG004	RATTLE BROOK NEAR NOAT HARBOUR	1981	42.7	Q R C	
02ZM022	RAYMOND BROOK AT OUTLET OF BAY BULLS BIG POND	1988		Q R C	REG
02ZJ002	SALMON COVE RIVER NEAR CHAMPNEYS	1983	73.6	Q R C	
02ZL004	SHEARSTOWN BROOK AT SHEARSTOWN	1983	28.9	Q R C	
02YP001	SHOAL ARM BROOK NEAR BADGER BAY	1982	63.8	Q R C	RMT
02YL004	SOUTH BROOK AT PASADENA	1983	58.5	Q R C	
02ZM021	SOUTH BROOK AT PEARL TOWN ROAD	1986	9.21	Q R C	
02ZN002	ST. SHOTTS RIVER NEAR TREPASSEY	1985	15.5	Q R C	DCP
02ZK005	TROUT BROOK NEAR BELLEVUE	1986	50.3	Q R C	
02ZM019	VIRGINIA RIVER AT CARTWRIGHT PLACE	1985	5.55	Q R C	
02ZM010	WATERFORD RIVER AT MOUNT PEARL	1981	16.6	Q R C	

CONTRIBUTED STATIONS

NEWFOUNDLAND
1990-91

STA. NO.	STATION NAME	ESTAB.	D.A.	AGENCY	REMARKS
03OA001	ASHUANIPI RIVER AT MENIHEK RAPIDS	1952	19000	IOCCL	REG RMT
03OC006	ATIKONAK RIVER AT GABBRO LAKE	1973	21400	CFLCO	REG73 RMT
03OD006	ATIKONAK RIVER AT OSSAKMANUAN LAKE CONTROL STRUCTURE	1977		CFLCO	REG64 RMT
03OD005	CHURCHILL RIVER AT CHURCHILL FALLS POWERHOUSE	1972	69200	CFLCO	REG71 RMT
02YL002	CORNER BROOK AT WATSONS BROOK POWERHOUSE	1959	127	DLPCL	REG
02YO001	EXPLOITS RIVER AT GRAND FALLS`	1914	8390	AB-PR	REG
02YK006	HINDS BROOK AT HINDS BROOK POWERHOUSE	1931	651	N&LHY	REG81
02YK001	HUMBER RIVER AT GRAND LAKE OUTLET	1898	5020	DLPCL	REG
02ZM003	MOBILE RIVER AT MOBILE FIRST POND	1962	112	NLPCL	REG
02ZM001	PETTY HARBOUR RIVER AT SECOND POND	1962	134	NLPCL	REG
02ZM002	PIERRES BROOK AT GULL POND	1962	117	NLPCL	REG
02YO003	RATTLING BROOK AT RATTLING BROOK POWERHOUSE	1962	378	NLPCL	REG
02ZE003	SALMON RIVER AT BAY D'ESPOIR POWERHOUSE	1967	5910	N&LHY	REG67
02YO004	SANDY BROOK AT SANDY BROOK POWERHOUSE	1964	508	NLPCL	REG

EXPLANATION OF SYMBOLS & ABBREVIATIONS

TYPE OF RECORD

H _ water level data

Q - flow data

TYPE OF GAUGE

M - manual gauge

R - automatic recording gauge

OPERATION SCHEDULE

C - continuous record

M - miscellaneous record

S - seasonal record

REMARKS

DCP - data collection platform

LRTAP - samples collected for acid precipitation monitoring

MET - data available from meteorological sensors

REG - regulated flow

REG78 - regulated flow since 1978

RMT - remote station accessed by aircraft

SED - sediment data currently being collected

TYP - typical stream; data used to produce statement on runoff conditions

WQ - samples collected for water quality natinal overview network

APPENDIX III

NATIONAL GUIDELINES FOR DESIGNATION

WATER QUANTITY SURVEY STATIONS

October 20, 1982

NATIONAL GUIDELINES FOR DESIGNATING WATER QUANTITY SURVEY STATIONS

These national guidelines of the Federal-Provincial Memoranda of Agreement for Water Quantity Surveys have been prepared by Canada in consultation with the Provinces for the purpose of designating federal, federal-provincial and provincial water quantity survey stations. In compliance with the agreements, the assignment and review of station designations is the responsibility of each Co-ordinating Committee.

The intent of these guidelines is to provide a uniform and consistent manner for designating water quantity survey stations throughout Canada. In these guidelines, "water quantity survey stations" have the same definition as in the Memoranda of Agreement and include water level, streamflow and sediment survey stations. The word "station" in these guidelines means "water quantity survey stations". Where not otherwise specified the word "Province" means "Province" or "Territory". The designation of each sediment station can be considered separately from the corresponding water quantity survey station designation.

FEDERAL STATIONS

There are stations that support programs of primary interest to the Government of Canada. These stations are funded 100 per cent by Canada in accordance with Article II and the procedures described in Schedules B, C, and D (F for the Yukon) (and Schedules E,D, and F for Quebec) of the Memoranda of Agreement.

1. Federal Department Programs

   These are stations required under statutory obligations that have developed in response to federal legislation and priorities, and as a result of programs of various federal government departments or agencies to provide quantity information on inland waters. These include stations operated in support of specific federal works, benchmark basins, studies or investigations, research projects, and to meet navigational requirements and management responsibilities. A station may be so designated where Canada has formally accepted responsibility for the continued operation of the station under an implementation agreement.

2. Interprovincial Rivers

   These are stations required for monitoring of waters flowing across or forming part of provincial or territorial boundaries where federal responsibility has been established by an agreement or where justified by an inter-jurisdictional concern.

3. International Waters

   These are stations associated with federal responsibilities arising from international agreements, treaties, orders or studies. These include:

a) Stations specifically named under the Boundary Waters Treaty and those approved officially as "International Gauging Stations".

b) Stations specifically stipulated under IJC orders, or required to support such orders; to provide for control of waters crossing or forming part of the international boundary and for IJC related study, surveillance, flow regulation or appointment purposes. Such stations may also be required for similar studies carried out under unilateral or bilateral mechanisms and undertaken in anticipation of the need for formal orders.

c) Stations related to international treaties and agreements which involve waters crossing or forming part of the international boundary and which specifically stipulate the reaches of streams required to be monitored or special arrangements that need to be made to meet water quantity survey needs.

d) Stations on streams flowing across or forming part of the international boundary for which Canada has determined that monitoring is required for water management purposes.

4. National Water Quantity Inventory

These are stations that provide information for a national inventory of surface waters. They consist of those stations required to determine water quantity trends in the major drainage basins in Canada that serve to provide an assessment of the total surface water resources and to measure significant discharge to the oceans.

FEDERAL-PROVINCIAL AND/OR FEDERAL-TERRITORIAL STATIONS

These are stations that support programs of joint interest to Canada and the Province. The construction and operation of these stations are funded in accordance with Article III and procedures described in Schedules B, C, and D (F for the Yukon) (and Schedules E, D and F for Quebec) of the Memoranda of Agreement.

1. Federal-Provincial Agreement

These are stations where joint federal and provincial (or territorial) responsibility is established under the terms and conditions of an agreement between Canada and one or more Province or Territories.

The joint funding arrangements for any particular agreement must be taken into consideration before designating a station in order to ensure the intended division of financial responsibility. Following the completion of federal-provincial water study, a station may be designated in this category only if its continuation would be in the joint interest of Canada and the Province.

2. River Basin Management

These are stations where both Canada and the Province have stated an interest in the need for information to support the management of the water resources of a river basin.

3. Regional Water Quantity Inventory

These are stations that provide an assessment of the quantity of water resources available in distinct hydrologic zones within each Province through representative sampling taking into consideration climatic variability, geographic and geologic differences, levels of population and development, basin size, streamflow regime, relationship to major groundwater resources and length of record.

PROVINCIAL AND/OR TERRITORIAL STATIONS

These are stations that support programs of primary interest to a Province. They are funded 100 per cent by the Province in accordance with Article IV and procedures described in Schedules B, C, and D (F for the Yukon) (and Schedules E, D, and F for Quebec) of the Memoranda of Agreement.

1. Provincial Department Programs

   These are stations required strictly for provincial programs where water quantity information on inland waters is needed.

2. Specific Purpose Monitoring Requirements

   These are stations established as a result of specific requests of provincial/territorial agencies, municipalities, or non-government organizations. All such requests shall be referred to the Province for screening and funding arrangements before being presented to the applicable Co-ordinating Committee.

CRITERIA FOR DESIGNATING STATIONS

UNDER GUIDELINE FEDERAL 4

NATIONAL WATER QUANTITY INVENTORY

1. Stations established on the main stem of large rivers discharging directly to the oceans as defined in the Hydrologic Atlas of Canada as those whose mean annual flow at the outlet of the river basin exceeds 400 m^3/sec.

2. Stations established on rivers for the purpose of determining water quantity trends or those located on rivers contributing discharge to the oceans whose mean annual flow at the mouth of the river is at least 85 m^3/sec.

3. Stations established for the purpose defined above whose drainage areas are greater than 200 km^2.

4. Stations of drainage area less than 200 km^2 may be established on rivers to determine discharge to the ocean and/or to assess the total water resource available in major hydrologic and climatic zones which are defined as follows:

   Island Provinces - P.E.I. and Newfoundland,
   Islands forming integral parts of Provinces/Territories,
   Major Peninsulas
   Distinctly identified hydrologic and/or climatic zones.

   The density of such stations shall be limited to those determined by official scientifically conducted station network analysis as required to determine the desired hydrologic parameters of the major geographical zones within the Province, Territory or Region.

APPENDIX IV

SCHEDULE B

ANNUAL PAYMENTS - ITEMS TO BE INCLUDED

SCHEDULE B

ANNUAL PAYMENTS - ITEMS TO BE INCLUDED

The items to be included in computing the annual payments of water quantity survey stations are:

I. OPERATIONAL COSTS WATER QUANTITY SURVEY STATIONS EXCLUDING SEDIMENT

a) Salaries and overtime of field personnel and casual labour;

b) Field travel expenses, board and lodging costs for field personnel;

c) The computer costs associated with computing daily mean hydrometric data;

d) Observer pay;

e) Depreciation, operation and maintenance of vehicles and boats;

f) Maintenance of gauging station structures including material and labour for minor repairs;

g) Maintenance and depreciation of all field equipment and instruments (except as noted in Article VII of this agreement);

h) Fuels such as propane for heating recorder installations and gas such as nitrogen for operating pressure sensing equipment, electricity charges;

i) Rental of aircraft, vehicles, boats, etc., supplied by either party or chartered;

j) The annual cost of land leases;

k) Services, e.g. cost of establishing gas caches, operation of line cabins, etc.

II. OPERATIONAL COSTS SEDIMENT STATIONS

All items in I OPERATIONAL COST plus:

1) The computer costs associated with computing daily mean sediment data;

2) Cost of analysis of sediment samples.

SCHEDULE B (cont'd)

III. NEW CONSTRUCTION REPAIR AND MAJOR RECONSTRUCTION COSTS FOR WATER QUANTITY SURVEY STATONS:

a) Salaries and overtime of construction personnel;

b) Field travel expenses, board and lodging costs of construction personnel;

c) Depreciation, operation and maintenance of vehicles;

d) Construction materials;

e) Maintenance, depreciation and operation of construction equipment;

f) Rental of aircraft, vehicles, boats, construction equipment, etc. supplied by either party or chartered;

g) Land acquisition costs including legal survey costs;

h) Construction contract payments.

APPENDIX V

PROCEDURE FOR

APPLICATION OF SCHEDULE B TO THE

ATLANTIC REGION AGREEMENTS

PROCEDURE FOR

APPLICATION OF SCHEDULE B TO THE

ATLANTIC REGION AGREEMENTS

The procedures used by Water Resources Branch, Atlantic Region, to determine operational costs under the Water Quantity Surveys Cost Sharing Agreements are based on the financial system called AFMAS. Under the Departmental coding structure, costs are divided into various object groups (01 to 25) and coded accordingly, by province.

SCHEDULE B

I. OPERATIONAL COSTS - WATER QUANTITY SURVEY STATIONS EXCLUDING SEDIMENT

Objective Groups 01, 02, 03 - Salaries and Overtime

This includes salaries and overtime payments of field technicians and supervisors. To account for work on activities outside the Agreement on Water Quantity Surveys, adjustments are applied to reasonably reflect the work time.

Object Group 04 - Travel

This group of costs includes field travel expenses for field personnel and other employees required for hydrometric survey work in the respective province.

Object Group 06 - Transportation

Included under this object group are costs for the transportation of goods and materials by truck, air, rail, and water.

Object Group 07 - Telecommunications

Expenses included within group are telephone services directly related to hydrometric operations.

Object Group 08 - Telecommunications

This group includes message and data services directly related to the hydrometric survey, excluding data processing costs which are considered separately below.

Object Group 11 - Professional Services

This object group includes salaries of gauge readers at hydrometric stations.

Object Group 15 - Other Services

This group includes costs associated with graphic services, short term employment, photographic services, brokerage fees, storage, printing, and department of Supply and Services service charges.

Object Group 16 - Rentals

(i) Includes rentals of aircraft, vehicles, boats and light machinery used for maintenance of gauging facilities.

(II) Annual cost of land leases for the establishment of or access to gauging stations (includes recorder shelters and cableways).

Object Group 17 - Repairs to Equipment

Repair and upkeep of such items as road motor vehicles, instrumentation, electrical equipment, survey equipment, snowmobiles, motor boats, ATV's, trailers, etc.

Object Group 18 - Building and Structure Repairs

This object group deals with all work done under contract toward the repair and upkeep of gauging facilities including shelter, stilling wells, cableways, weirs, flumes, bridges, stairways, access roads, etc.

Object Group 19 - Public Utility Services

Electrical services obtained through a public utility company.

Object Group 20 - Purchased Materials

Gasoline and oil for road motor vehicles is the major cost item in this cost group. Other costs include gas and oil for other motorized equipment, building materials, nitrogen for manometer stations, propane, working clothes and footwear, recorder charts, etc.

Object Group 21 - Parts and Consumable Tools

Includes items such as plumbing equipment and fittings, electrical equipment and fittings, batteries, scientific equipment, heating equipment, measuring equipment, safety equipment, hand tools, boats, rubber tires, etc.

Data Processing Costs

Up to and including 1983-84, all data processing was done using the main frame computer facilities located at Bedford Institute of Oceanography. For 1983-84 the data processing cost amounted to $25,000.

During 1983-84, a PDP 11/44 mini computer system was installed at the offices of Water Resources Branch, Dartmouth. For 1984-85 the new facility was completely operational.

In accordance with "Compendium of Practices, Interpretations and Administrative Procedures used by Co-ordinating Committee in Implementing the Water Quantity Survey Agreements", the annual computing cost would include the capital expenditure for the mini computer system, the annual operating cost (AOC) and the annual maintenance cost (AMC). The capital is recovered over a ten year period through an imputed rental charge (IRC), determined by amortizing the capital expenditure over a period of ten years. Therefore, the evolving formula would be:

Total Shareable Annual Computing Cost = IRC + AOC + AMC

If the Total Shareable Annual Computing Cost exceeds the cost for the base year, 1983-84, multiplied by the annual national cost increase factors, then the latter cost will be used. This has been the case for the years 1984-85 to 1990-91, therefore, the base year cost updated by the national cost increase factors, has been used.

During 1990-91 a more modern/powerful micro VAXII (Q5 series) computer system was purchased as surplus equipment at considerably less cost than the PDP 11/44 computer. All existing software was adapted for use on the new computer and the PDP 11/44 was gradually phased out. For 1991-92 all data processing will be handled by the VAX system. At the same time a detailed inventory of all data processing equipment at Dartmouth and sub-offices was compiled, with an effective date of April 1, 1991. Starting with 1991-92 the data processing cost will be determined from the above formula. The IRC (Imputed Rental Charge) will be determined as 10% of all current equipment on inventory, as updated once per year.

In the Atlantic Region the Total Shareable Annual Computing Cost is proportioned among the four cost sharing agreements by the number of gauging station records processed.

Depreciation of Vehicles

Road motor vehicles in the Atlantic Region are depreciated in accordance to the "Compendium of Practices, Interpretations and Administrative Procedures Used by Co-ordinating Committees in Implementing the Water Quantity Survey Agreements". By this compendium Report the Multi-Purpose Vehicles, Vans and trucks used in the Atlantic Region are depreciated over a term of six years from the original capital purchase cost.

To calculate this depreciation, the actual capital cost of the vehicle is divided by 72 months to give a monthly depreciation. The monthly depreciation is multiplied by the actual number of months that a vehicle served in a particular province, to give the annual depreciation for the vehicle.

During the past two years pick-up trucks fitted with special enclosures for housing field equipment have been purchased to satisfy health and safety requirements. The enclosures are expected to serve for two vehicle lifetimes, and therefore, half the value of the enclosure is added to the vehicle purchase price for depreciation purposes.

Depreciation of Field Equipment and Instrumentation

Field equipment and instrumentation are depreciated at a rate of 10% of the current value of the cost-shareable inventory as determined once a year. Normally, only items acquired through capital purchases are included on the cost-shareable inventory.

II. THE OPERATIONAL COST OF SEDIMENT STATIONS

All cost items included in Section I except salaries, overtime and depreciation of vehicles, as they relate to Sediment Surveys, are included in the operational costs for the Sediment Network. Also included is the cost of laboratory analysis for suspended concentration and particle size distribution.

III. CONSTRUCTION AND MAJOR REPAIR COSTS FOR WATER QUANTITY SURVEY STATIONS

Once a major repair or new construction project has been identified, it is assigned a cost code to which all related costs are assigned. Some of this work is contracted out with the initial reconnaissance and the general supervision on-site provided by Water Survey of Canada.

If contracted out, the total cost is comprised of:

- Overtime of Water Survey of Canada supervisory personnel.

- Field travel expenses, board and lodging costs of supervisory personnel provided by Water Survey of Canada.

- If a pressure installation, the cost of the manometer and pressure unit accessory equipment such as gas and cylinders. The water level recorder is not charged.

- Charter aircraft.

- Land acquisition costs if any.

- Construction contract payments.

  Department of Supply and Services contract procedures are followed.

<u>If constructed</u> by Water Survey of Canada personnel, costs include:

- Overtime of Water Survey of Canada supervisory personnel.

- Field travel expenses, board and lodging costs of Water Survey of Canada staff. Expenses associated with reconnaissance and construction.

- If a pressure installation, the cost of the pressure unit and accessory equipment such as gas and cylinders.

- Construction materials - All items required for the construction of stilling wells, shelters, cableways, controls and survival shelters.

- Rental of aircraft, vehicles, boats, construction equipment associated with the project.

- Land acquisition costs if required.

- Construction contract payments - The services of construction equipment operators for backhoe and bulldozer are usually involved.

APPENDIX VI

SCHEDULE C

PROCEDURES FOR PREPARATION OF ANNUAL PAYMENTS

SCHEDULE C

PROCEDURES FOR PREPARATION OF ANNUAL PAYMENTS

a) The annual payment is composed of two parts, the annual operating costs and the costs of construction for streamflow and water level installations and sediment installations.

b) The annual payment shall be computed for each year the agreement is in effect.

c) Cost data to be used as a basis for computing each annual payment will be the cost data from the latest available full fiscal year.

d) A cost index factor is to be used in computing the annual payment for the year in question commensurate with sound engineering practice.

e) The average annual unit costs for operating water quantity survey stations listed in Schedule A but not including sediment stations will be determined from the cost data of c) above and where necessary, because of significant differences in transportation costs, these average annual unit costs will be computed for more than one area or condition of operation.

f) The total annual operation cost of the water quantity survey stations listed in Schedule A but not including sediment stations will be the summation of the appropriate average annual unit cost for each station multiplied by the cost index factor as determined in item d) above.

g) The total annual operation cost of the sediment stations listed in Schedule A will be the summation of the annual operating cost for each station multiplied by the cost index factor as determined in item d) above.

h) The construction cost to be apportioned in accordance with Articles II, III and IV will be the summation of the construction cost for each new, or reconstructed water quantity survey station. The entire cost of construction is to be included in the annual payment. Construction costs are to be determined using data from reconnaissance surveys, standard plans, etc. and incorporating the cost index factor from item d) above.

i) In cases where there is a significant deviation between the cost determined in (f), (g) and (h) and actual costs because of the cost index factor used, or changes in the construction program due to unforseen circumstances such as flooding, an adjustment may be made in the final quarterly payment (March 1st) or the next fiscal year to more accurately reflect the cost shares of the parties to this agreement.

APPENDIX VII

SCHEDULE D

SUMMARY OF ANNUAL PAYMENT

SCHEDULE D

This schedule provides a summary of the annual payment. The details of the calculations for operation and construction are available and have been jointly reviewed by officers of each party.

ANNUAL PAYMENT FOR 1990-91 TO BE PAID TO THE RECEIVER GENERAL FOR CANADA BY THE PROVINCE OF NEWFOUNDLAND.

	Operation	Construction	Total
a) Streamflow and water level installations	$260,691	--	$260,691
b) Sediment installations	5,925	--	5,925
c) Data collection platform installations	11,678	--	11,678
d) Humber River meteorological stations (3)	2,000	--	2,000
		ANNUAL PAYMENT	$280,294

D. G. Jeans
Assistant Deputy Minister
Department of Environment

Administrator for Province

S. L. Fenety
Director, Atlantic Region
Inland Waters Directorate

Administrator for Canada

APPENDIX VIII

MINUTES OF COORDINATING COMMITTEE MEETING

WATER QUANTITY SURVEYS

CANADA -NEWFOUNDLAND

CO-ORDINATING COMMITTEE ANNUAL MEETING

1990-91

The Co-ordinating Committee for the Canada-Newfoundland Agreement on Water Quantity Surveys met on March 25, 1991 at the Confederation Building, St. John's, Newfoundland. In attendance at the meeting were the following:

W. Ullah - Newfoundland Department of Environment and Lands

D. McBride - Environment Canada

C. Baker - Environment Canada

H. Khan - Newfoundland Department of Environment and Lands

R. Picco - Newfoundland Department of Environment and Lands (part time)

D. Randall - Environment Canada

1. Annual Report For 1989-90

D. McBride referred to page no. 14 of the 1989-90 annual report where schedule "D" payments are compared to actual costs over the years of the Agreement. It was noted that the net balance represents a $21,543 underpayment by the Province.

W. Ullah raised a question on the number of years the that Province has made payments for recovery of costs from the special DCP purchase - D. Randall replied stating that payments have been made over 5 or 6 years. (NOTE: specifically since 1986-87)

H. Khan in reviewing the report asked why expenditures exceeded estimates on certain points. D. Randall noted that an explanation has been provided in the report on page no. 3 to explain salaries, maintenance, and helicopter costs. C. Baker explained that helicopter rental costs have been increasing dramatically over the past 2 years.

D. McBride discussed possible means for eliminating the net balance. W. Ullah suggested that the net balance only represented a small amount in comparison to the total dollars exchanged over the years.

W. Ullah, in line with notes from H. Khan, introduced the idea of moving more stations into the Federal category. He also noted the high cost of helicopter travel and suggested the possibility of eliminating a trip or two. C. Baker responded by stating that one trip to Labrador had been dropped for 1989-90 but was restored for 1990-91. He said that the stage-discharge relationships at stations are very good except for extreme stages, however, the trips are undertaken specifically to maintain instrumentation.

D. McBride said that the stations in Labrador are prime candidates for conversion to digital. He said that WRB must get rid of manometers. C. Baker discussed that relative costs involved for a analoger recorder/manometer vs logger/transducer.

2. **Schedule "A" Listings of Gauging Stations Responsibility Classifications For 1991-92**

Prior to discussing this item the "Estimmated Cost of Operations", item no.4, was discussed.

It was agreed to move 4 stations from Provincial category to Federal-Provincial. Therefore, from the schedule "A" listings for 1990-91, the following stations will be moved from Provincial to Federal-Provincial category for 1991-92:

- Little Codroy River near Doyles
- Middle Arm Brook below Flatwater Pond
- Peters River near Botwood
- Rattle Brook near Boat Harbour

3. **Sediment Survey**

C. Baker discussed the work which had been completed on sediment station profiles. Station management plans have been developed to indicate the requirement for sampling at certain stages. From this study it has been suggested that enough sediment data has been acquired at the station, Northeast Brook near Roddickton. It was agreed that a summary report for the Roddington station should be prepared. D. McBride said that this will be part of the Hydrology Division workplan

D. McBride said that monitoring should be moved from Northeast Brook to some other stream where an issue exists. C. Baker said that an observer must be available at a site before final selection. W. Ullah inquired as to whether any automatic sediment samplers were in operation. C. Baker said that two samplers were in operation - on Waterford River and Highlands River.

C. Baker discussed the proposed plan for miscellaneous sediment sampling in Newfoundland. Each technician will be assigned 2 stations where sediment samples will be obtained upon each open water visit.

4. **Estimated Cost of Operation**

D. McBride introduced this topic and refered to the handouts by D. Randall covering a few scenarios. D. Randall said that scenario no.1 was the cost estimate prepared earlier in the month. The estimate represents a delay of 3 months in filling the vacant position in Corner Brook. It was the same as the estimate sent out in January excepting, the data processinng costs which were slightly increased to reflect true costs with the new VAX Q5 computer on line and the helicopter rentals in Labrador which were increased by $10,000. Scenario no. 1 indicated that the same stations from 1990-91 would also be operated during 1991-92, excepting discontinuance of one Grand Lake station. The classifications would remain the same and the Provincial share would be over $290,000.

Scenario no.2 represented a shift in classification for 3 Provincial stations to Federal-Provincial, such that the Provincial share would be somewhat less.

Scenario no. 3 represented a drastic cut of some 15 stations plus the reduction of one technician PY.

W. Ullah stated that he wished to go with scenario no. 2, however in order to fit the Provincial funds available, he required the movement of one additional station from Provincial to Federal-Provincial classification. Therefore, the Provincial share, as agreed, would be in the order of $285,000.

5. **Results From Verification Surveys at Contributed Data Stations**

C. Baker reported on the surveys which took place during 1990.

As a result of the surveys at Grand Falls for Abitibi Price, the company has re-adjusted formula for determining flow. He noted that the measurement by WSC staff was only at one stage. There was no spill over the Mill Pond Dam at the time. If the dam was spilling another variable would be added.

At Rattling Brook turbine no. 1 was rated and this was followed by rating of both turbines. A report was completed.

One measurement was obtained at low tide at Bay D'Espoir. This measurement checked with the plant rating within a small percentage.

D. McBride and W. Ullah remarked on the merits of evaluating these ratings at contributed stations. C. Baker said that he would like to obtain a check at Deer Lake plant during 1991-92.

D. McBride mentioned the idea of approaching companies to sell the idea of re-calibration, perhaps yielding different efficiencies. He raised the question on whether contributed data should be published without being verified.

W. Ullah said that there is other data collected by companies that is not published, eg. Cat Arm River. It was suggested that WSC could conduct surveys to calibrate turbines on a cost recovery basis.

C. Baker discussed his contact via letter with Churchill Falls Labrador Company (CFL Co.) about 2 years ago regarding continuing monitoring of rivers following completion of the development. No response has been received. W. Ullah requested a copy of the letter sent and said that he will make contact with the company.

6. Proposal For A Newfoundland Hydrometric Network Evaluation

D. McBride reviewed that which has taken place in Prince Edward Island in regard to network evaluation. The study which centred upon groundwater is almost completed.

It is desireable to start a network evaluation in Newfoundland. For 1991-92 the Hydrology Division, Dartmouth have a full work load. There is not much time available to contribute to a network evaluation. W. Ullah said that the evaluation would only include surface water - not groundwater nor water quality. The study could move to the social-economic linkages later in the study.

W. Ullah suggested that he and D. Ambler arrange a meeting and discuss plans for the year. D. McBride suggested that 1991-92 could be considered as a planning year. W. Ullah requested a copy of all seven report volumes from the New Brunswick evaluation.

7. Other Topics

(a) Branch Reorganization

D. McBride discussed the proposed scheme for reorganization of Inland Waters Directorate. He noted the reorganization in British Columbia where the Water Resources Branch was separated into five divisions. He also discussed the review of all water programs in Canada and the proposal to turn Water Resources Branch nationally into s Special Operating Agency.

(b) Project 2000 - Modernization

D. McBride explained that Project 2000 was a planned modernization of WRB field instrumentation and data processing methods to be completed by year 2000. The Province of Alberta have been assigned the pilot project to test equipment and procedures over a 3 year period, with up to 1 million dollars being spent. C. Baker noted one of the Atlantic Region contributions to Project 2000 where a data logger with satellite transmitter has been installed at a Churchill River water level site. D. McBride said that he may contribute up to $30k capital to purchase data loggers and transducers during the coming year. He noted that there are perhaps data loggers in place in the Atlantic Region and he will now look at Labrador for the next installations. There was agreement that cutting the August trip to Labrador may be the approach should dollars be a problem. D. McBride said that with data loggers and real-time information it may be possible to reduce visits to Labrador, perhaps to only once per year.

(c) **Green Plan**

W. Ullah raised the question on the possible benefits to be derived from the Green Plan. D. McBride said that WRB HQ requested a listing of all gauging stations across Canada where upgrades for instrumentation would assist in flood forecasting above urban centres. About 3 sites were noted for Newfoundland. A submission was made for instrumentation upgrades.

R. Picco mentioned the DOMSAT system. He said for an expenditure of less than $20k one can have dish setup whereby data received by GOES is re-broadcast to a domestic satellite and hence received via dish.

(d) **Forecasting on Humber River**

R. Picco reported that most instrumentation at the Humber River sites is in place. He expressed his thanks to WSC staff for ensuring the completion of the installations. He noted that the gauging site on Grand Lake at Main Dam had been discontinued.

For WSC staff involvement in the operation of the meteorological instrumentation in the Humber River Watershed the Province pays $2000 on the Schedule "D" to cover normal operating expenses. Should there be an interuption in transmissions from a fly-in station then the Province would have to finance a special helicopter trip if the information is considered vital.

It was agreed tnat a MOU should be prepared to cover responsibilities and priorities. C. Baker and R. Picco will draft a MOU for discussion by the Co-ordinators. R. Picco stated that the plan for the Humber River is now in place and there are presently no expansion plans.

R. Picco displayed printouts show DCP data converted to flow data as well as met parameters for the Grey River station.

APPENDIX IX

ESTIMATED COSTS FOR 1991-92

WATER QUANTITY SURVEYS

PROVINCE OF NEWFOUNDLAND

ISLAND - 1991-92

ESTIMATED OPERATIONAL COSTS FOR HYDROMETRIC SURVEYS

Personnel - Basic Pay - 01, 02, 03 (Salaries of hydrometric technical staff including overtime)	$265,600
Transportation and Communication	
Travel and Removal - 04	23,000
Transportation and Postage - 06	2,000
Telecommunications - 07, 08	1,000
Professional and Special Services	
Professional Services - 11	1,500
Other Services - 15	6,000
Rentals	
Rentals - 16	45,000
Purchased Repair and Upkeep	
Equipment Purchased and Repairs - 17	6,000
Building and Structures Repairs - 18	1,000
Utilities, Materials and Supplies	
Public Utility Services - 19	1,500
Purchased Materials - 20	20,000
Parts and Consumable Tools - 21	12,000
Other Costs - Data Processing Costs	11,600
- Depreciation of Vehicles (6)	16,000
- Depreciation of Field Equipment and Instruments	8,000
TOTAL	$420,200

WATER QUANTITY SURVEYS

PROVINCE OF NEWFOUNDLAND

LABRADOR - 1991-92

ESTIMATED OPERATIONAL COSTS FOR HYDROMETRIC SURVEYS

Personnel - Basic Pay - 01, 02, 03 (Salaries of hydrometric technical staff including overtime)	$52,100
Transportation and Communication	
Travel and Removal - 04	$15,000
Transportation and Postage - 06	2,000
Telecommunications - 07	NIL
Professional and Special Services	
Professional Services - 11	NIL
Other Purchased Services - 15	2,000
Rentals	
Rentals - 16	65,000
Purchased Repair and Upkeep	
Equipment Purchased and Repairs - 17	500
Building and Structures Repairs - 18	NIL
Utilities, Materials and Supplies	
Public Utility Services - 19	NIL
Purchased Materials - 20	3,000
Parts and Consumable Tools - 21	2,000
Other Costs - Data Processing Costs	1,700
- Depreciation of Field Equipment and Instruments	3,000
TOTAL	$146,300

WATER QUANTITY SURVEYS

PROVINCE OF NEWFOUNDLAND

1991-92

ESTIMATED OPERATIONAL COSTS FOR SEDIMENT SURVEYS

Personnel - Basic Pay - 01, 02, 03	$ NIL
Transportation and Communication	
Travel and Removal - 04	$ 500
Transportation and Postage - 06	500
Telecommunications - 07	NIL
Professional and Special Services	
Professional Services - 11	1,000
Other Purchased Services - 15	100
Rentals	
Rentals - 16	NIL
Purchased Repair and Upkeep	
Equipment Purchased and Repairs - 17	200
Building and Structures Repairs - 18	NIL
Utilities, Materials and Supplies	
Public Utility Services - 19	NIL
Purchased Materials - 20	500
Parts and Consumable Tools - 21	100
Other Costs - Sample Analysis	4,500
- Depreciation of Field Equipment and Instruments	1,200
TOTAL	$8,600

WATER QUANTITY SURVEYS

CANADA-NEWFOUNDLAND COST SHARING AGREEMENT

1991-92 ESTIMATED PROVINCIAL COST

HYDROMETRIC

ISLAND

Station Classification	Stations	Station Units
F1	6	6.0
F4	11	11.0
FP3	44	44.0
P1	23	21.2
TOTAL	84	82.2

Average Cost/Station Unit = $420,200/82.2 = $5,112
Provincial Share = $5,112 (44.0/2) + 5,112 (21.2) = $220,838

LABRADOR

Station Classification	Stations	Station Units
F2	2	2.0
F4	4	4.0
FP3	3	3.0
P1	4	1.7
TOTAL	13	10.7

Average Cost/Station = $146,300/10.7 = $13,673
Provincial Share = $13,673 (3.0/2) + 13,673 (1.7) = $43,753

SEDIMENT

Station Classification	Stations
FP	2
P	2
TOTAL	4

Average Cost/Station = $8,600/4 = $2,150
Provincial Share = $2,150 (2/2) + $2,150 (2) = $6,450

TOTAL PROVINCIAL SHARE:

Hydrometric (Island)	- $220,838
Hydrometric (Labrador)	- 43,753
Sediment	- 6,450
Data Collection Platforms	- 11,678
Humber River Met Stations	- 2,000
TOTAL	$284,719